

S&H Form: (02/05)

SAR
IFW**FEE TRANSMITTAL**

FEE TRANSMITTAL	Attorney Docket No.	953.1015	
	Application Number	10/774,490	
	Filing Date	February 10, 2004	
	First Named Inventor	Yutaka UEMATSU et al.	
	Group Art Unit	3748	
AMOUNT ENCLOSED	620.00	Examiner Name	Binh Q. Tran

FEE CALCULATION (fees effective 12/08/04)

CLAIMS AS AMENDED	Claims Remaining After Amendment	Highest Number Previously Paid For	Number Extra	Rate	Calculations
TOTAL CLAIMS	4	- 20 =	0	X \$ 50.00 =	\$ 0.00
INDEPENDENT CLAIMS	4	- 4 =	0	X \$ 200.00 =	0.00
Since an Official Action set an <u>original</u> due date of <u>June 3, 2006</u> , petition is hereby made for an extension to cover the date this reply is filed for which the requisite fee is enclosed (1 month (\$120)); (2 months (\$450)); (3 months (\$1,020)); (4 months (\$1,590)); (5 months (\$2,160)):					120.00
If Appeal Brief is enclosed, add (\$500.00)					500.00
If Statutory Disclaimer under Rule 20(d) is enclosed, add fee (\$130.00)					
Information Disclosure Statement (Rule 1.17(p)) (\$180.00)					
Total of above Calculations =					\$ 620.00
Reduction by 50% for filing by small entity (37 CFR 1.9, 1.27 & 1.28)					
TOTAL FEES DUE =					\$ 620.00

(1) If entry (1) is less than entry (2), entry (3) is "0".

(2) If entry (2) is less than 20, change entry (2) to "20".

(4) If entry (4) is less than entry (5), entry (6) is "0".

(5) If entry (5) is less than 3, change entry (5) to "3".

METHOD OF PAYMENT

- ☒ Check enclosed as payment.
- ☐ Charge "TOTAL FEES DUE" to the Deposit Account No. below.
- ☐ No payment is enclosed.

GENERAL AUTHORIZATION

- ☒ If the above-noted "AMOUNT ENCLOSED" is not correct, the Commissioner is hereby authorized to credit any overpayment or charge any additional fees necessary to:
- Deposit Account No. 19-3935
- Deposit Account Name STAAS & HALSEY LLP
- ☒ The Commissioner is also authorized to credit any overpayments or charge any additional fees required under 37 CFR 1.16 (filing fees) or 37 CFR 1.17 (processing fees) during the prosecution of this application, including any related application(s) claiming benefit hereof pursuant to 35 USC § 120 (e.g., continuations/divisionals/CIPs under 37 CFR 1.53(b) and/or continuations/divisionals/CPAs under 37 CFR 1.53(d)) to maintain pendency hereof or of any such related application.

SUBMITTED BY: STAAS & HALSEY LLP

Typed Name	John C. Garvey	Reg. No.	28,607
Signature		Date	6-30-06

©2005 Staas & Halsey LLP



Docket No.: 953.1015

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Yutaka UEMATSU et al.

Serial No. 10/774,490

Group Art Unit: 3748

Confirmation No. 8919

Filed: February 10, 2004

Examiner: Binh Q. Tran

For: NOX CATALYST REGENERATION METHOD FOR NOX PURIFYING SYSTEM AND
NOX PURIFYING SYSTEM

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Mail Stop Appeal Brief-Patents
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

In a Notice of Appeal filed April 3, 2006, the applicant appealed the Examiner's November 1, 2005 Office Action finally rejecting claims 1-4. Submitted herewith are an Appeal Brief, a Petition for a one-month extension of time, and the requisite fees set forth in 37 C.F.R. § 1.17(a) and § 41.20(b).

07/03/2006 SZEWDIE1 00000009 10774490

01 FC:1402
02 FC:1251

500.00 OP
120.00 OP

I. REAL PARTY IN INTEREST

The real party in interest is Isuzu Motors Limited, the assignee of this application.

II. RELATED APPEALS AND INTERFERENCES

Appellant, appellant's legal representative, and the assignee do not know of any prior or pending appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by, or have a bearing on, the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1-4 have been rejected and are on appeal.

IV. STATUS OF AMENDMENTS

An Amendment Under 37 C.F.R. § 1.116 was filed February 1, 2006. This Amendment did not amend any of the claims. In an Advisory Action mailed February 16, 2006 the Examiner indicated that the Amendment would be entered for purposes of appeal. A Notice of Appeal was filed April 3, 2006. Therefore, all claims in the attached Appendix have been entered in the subject application.

V. SUMMARY OF CLAIMED SUBJECT MATTER

A. Claim 1

Independent claim 1 recites a method for generating a NOx catalyst in a NOx purifying system (see, for example, NOx purifying system 10 and catalyst 32 in Fig. 1, and paragraphs [0024] and [0025] on page 7 of the specification.) The NOx purifying system 10 has a direct reduction type NOx catalyst (32) provided in an exhaust passage illustrated in Fig. 1, and directly decomposing NOx during a lean condition operation (steps S11-S14 in Fig. 2 and paragraphs [0031] to [0034] on page 9 of the specification). The direct reduction type NOx catalyst is regenerated during a rich condition operation (see, for example, steps S17 through S20 in Fig. 2 of the application, paragraphs [0036] to [0039] on page 10 of the specification, and paragraph [0040] on page 11 of the specification).

In accordance with the method of claim 1, a rich condition control is prohibited when the temperature detected by a catalyst temperature detector is greater than a set temperature which is within a predetermined temperature range of between 400°C and 500°C. (See, for example, steps S15 and S16 in Fig. 2 of the application and the graph of Fig. 3 of the application, as well as paragraph [0035] on pages 9 and 10 of the specification.)

B. Claim 2

Independent claim 2 recites a NOx purifying system (see, for example, NOx purifying system 10 in Fig. 1) having a direct reduction type NOx catalyst provided in an exhaust passage (see, for example, catalyst 32 provided in an exhaust passage as illustrated in Fig. 1 and paragraphs [0024] and [0025] on page 7 of the specification). The direct reduction type NOx catalyst 32 directly decomposes NOx during a lean condition operation (steps S11 – S14 in Fig. 2 and paragraphs [0031] to [0034] on page 9 of the specification). The direct reduction type NOx catalyst 32 is regenerated during the rich condition operation (see, for example, steps S17 – S20 in Fig. 2 of the specification, paragraphs [0036] to [0039] on page 10 of the specification, and paragraph [0040] on page 11 of the application).

The system 10 comprises a catalyst temperature detector (see, for example, temperature sensor 71 in Fig. 1 and paragraph [0026] on page 7 of the specification). The system 10 also includes a control device (for example, ECU 60 in Fig. 1 and paragraph [0027] on page 8 of the specification) to prohibit a rich condition control when the temperature detected by the catalyst temperature detector is greater than a set temperature which is within a predetermined temperature range of between 400°C and 500°C. (See, for example, steps S15 and S16 in Fig. 2 of the specification and the graph of Fig. 3 of the application, as well as paragraph [0035] on pages 9 and 10 of the specification.)

C. Claim 3

Independent claim 3 recites a method for regenerating a direct reduction type NO_x catalyst in an exhaust passage. (See, for example, catalyst 32 provided in an exhaust passage illustrated in Fig. 1 and paragraphs [0024] and [0025] on page 7 of the specification.) The method includes detecting the direct reduction type NO_x catalyst temperature (see, for example, step S15 and paragraphs [0026] and [0035] of the specification).

The method also includes regenerating the NO_x while performing a rich condition operation only when the detected temperature is less than the set temperature which is between 400°C and 500°C (see, for example, steps S16 – S20 and Fig. 2 of the specification, and the graph of Fig. 3 of the specification, as well as paragraphs [0035] to [0040] on pages 9-11 of the specification).

D. Claim 4

Independent claim 4 recites an NO_x purifying system having a direct reduction type NO_x catalyst provided in an exhaust passage. (See, for example, NO_x purifying system 10 having a catalyst 32 provided in an exhaust passage, as illustrated in Fig. 1 and described in paragraphs [0024] and [0025] on page 7 of the specification.)

The NO_x purifying system includes a catalyst temperature detector detecting a temperature of the direct reduction type NO_x catalyst. (See, for example, temperature detector 71 which detects a temperature of the direct reduction type NO_x catalyst 32 illustrated in Fig. 1 and described in paragraph [0026] on page 7 of the specification.) The NO_x purifying system also includes a control device (see, for example, control device 60 in Fig. 1) which causes a rich condition control to be performed only when the temperature detected by the catalyst temperature detector is less than a set temperature which is between 400°C and 500°C (see, for example, steps S15 – S20 in Fig. 2 of the specification, and the graph of Fig. 3 of the specification, as well as paragraphs [0035] to [0040] on pages 9-11 of the specification).

B. Description of the Other Claims

“Means” or “Step”

None of the claims contain an element expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The first ground of rejection to be reviewed is the rejection of claims 1-4 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,526,643 to Mukaihira et al. in view of design choice.

The second ground of rejection presented for review is a rejection of claims 1-4 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,644,021 to Okada et al. in view of design choice.

VII. ARGUMENT

A. Review of the Prior Art

1. U.S. Patent No. 5,526,643 to Mukaihira et al.

The Mukaihira et al. reference is directed to a system for diagnosing deterioration of a catalyst. The temperature of the catalyst is estimated using an operating state signal of the engine by using a diagnostic device. The conversion efficiency of the catalyst is calculated from the output of oxygen sensors. The deterioration state of the catalyst is diagnosed on the basis of the corrected temperature by the diagnostic device.

2. U.S. Patent No. 6,644,021 to Okada et al.

U.S. Patent No. 6,644,021 to Okada et al. is directed to an exhaust gas purifying apparatus of an internal combustion engine in which the temperature of an occlusion-type NOx catalyst is increased to emit SOx when the temperature of the occlusion-type NOx catalyst is not less than a set temperature. This is done to prevent deterioration of fuel consumption and to enable the regeneration of a catalyst device by efficiently desorbing a sulfur compound from the catalyst device. In particular, Okada et al. discloses performing S purge control to control the regenerating of the catalyst device by desorbing a sulfur compound from the catalyst.

B. Claims 1-4 are Patentable Over Mukaihira et al. in view of Design Choice

1. Claim 1

The present claimed invention as set forth, for example, in claim 1, is directed to a catalyst-deterioration diagnostic system. In contrast, Mukaihira et al. does not contain any teaching or suggestion relating to “a direct reduction type NOx catalyst”, “a rich condition operation” or “a lean condition operation” as recited, for example, in claim 1. Further, Mukaihira et al. does not disclose the feature of “prohibiting a rich condition control when the temperature detected by a catalyst temperature detector is greater than a set temperature which is within a predetermined temperature range of between 400°C and 500°C.”

Mukaihira et al. relates to diagnosis of the deterioration state of a catalyst and does not contain any description of regeneration control or prohibition of a rich condition control as set forth in the claims. In particular, while the Examiner references catalyst 40 in Mukaihira, there is no indication in Mukaihira or the Examiner's rejection that catalyst 40 corresponds to the claimed reduction type NOx catalyst. Further, Mukaihira is absolutely silent regarding the claimed features of “a rich condition operation” or “a lean condition operation”.

On page 2 of the Office Action the Examiner cited columns 8-10 for disclosing a predetermined temperature range of 350°C and 450°C. These temperatures are used to describe boundaries of “conversion efficiency” as described at column 9, lines 12-25. According

to Mukaihira et al., a deterioration judgment of the catalyst is carried out in a range (regions II and III). Each temperature is higher than T_{x1} , and in a range (region II) whose temperature is between T_{x1} and T_{x2} . Correction of the conversion efficiency is calculated based on actual measurement data, while no correction is made in a range (region II) whose temperature is higher than T_{x2} . Mukaihira et al. is completely devoid of any suggestion which would provide motivation to associate the values 350°C (T_{x1}) and 450°C (T_{x2}) with a “rich condition operation” and “NOx catalyst regeneration” in accordance with the present claimed invention. Thus, it is submitted that the temperature limitations described in Mukaihira et al. (350°C and 450°C) have absolutely nothing to do with the claimed temperature range in which the rich condition control is prohibited according to the claimed invention.

Referring to column 4, lines 33-37 of Mukaihira et al., the Mukaihira et al. system is summarized as follows:

... the temperature of the catalyst can be known without using a thermometer. Moreover, since the deterioration state of the catalyst is decided after the correction of the calculated conversion efficiency, it is diagnosed precisely.

Thus, Mukaihira et al. has nothing to do with the effects or result of the present claimed invention described at paragraph [0019] of the subject specification as follows:

And, by the NOx catalyst regeneration method of this NOx purifying system and the NOx purifying system, the rich condition control can be performed avoiding the temperature range of the catalyst in which the NOx concentration is increased at the catalyst outlet during the rich condition control. Therefore, it is possible to efficiently purify the NOx in the exhaust gas while preventing the NOx from being discharged into the atmospheric air. Moreover, since the direct reduction type NOx catalyst can surely be regenerated under the rich condition control, the fuel cost can be prevented from worsening.

On pages 2 and 3 of the Office Action, the Examiner states:

Regarding the specific range of the catalyst air ratio and the catalyst temperature, it is the examiner's position that a range between 400°C and 500°C of the catalyst temperature, would have been an obvious matter of design choice well within the level of ordinary skill in the art, depending on variables such as mass flow rate of the exhaust gas, as well as the size of the engine, properties of materials for making the NOx storage catalyst, and the controlled temperature of the catalytic converter.

It is submitted that the Examiner's statement completely ignores the fact that Mukaihira et al. is silent as to the temperature range being associated with a “rich condition operation” and “NOx catalyst regeneration” in accordance with the present claimed invention.

Mukaihira et al.'s silence is not surprising since it is intended to diagnose the state of a deteriorating catalyst. Therefore, it is submitted that the Examiner's reliance upon "design choice" is misplaced.

There is no teaching or suggestion in the Mukaihira et al. reference that would have led one of ordinary skill in the art to modify Mukaihira et al., to include the temperature range of 400 °C to 500 °C in order to prohibit a rich condition control to achieve purification of NOx. Therefore, modification based on "design choice" was not within the capabilities of one skilled in the art. *In re Aller*, 42 C.C.P.A. 824, 220 F.2d 454, 456, 105 USPQ 233, 235 (C.C.P.A. 1955). Thus, the Examiner's position that the claimed temperature range is an obvious matter of design choice is precluded because the claimed structure and the function the claimed structure performs are different from the cited art.

The Examiner contends that there is nothing in the record that suggests the claimed parameters present a novel or unexpected result. See *In re Kuhle*, 562 F.2d 553, 188 USPQ 7. (CCPA 1975).

Applicants disagree with the Examiner's position. The novel features recited in the present claimed invention as set forth in claim 1, include the control device to prohibit a rich condition control when the temperature detected by the catalyst temperature detector is greater than the set temperature that is within a predetermined temperature range of between 400 °C and 500 °C. These novel features produce the result of efficiently purifying the NOx in the exhaust gas, while preventing the NOx from being discharged into the atmosphere. (See Specification, Paragraph [0019]).

As discussed above, there is nothing in the prior art that discusses the above-identified features of claim 1. The prior art is silent as to the prohibition of a rich control condition control when the temperature detected is greater than the predetermined range between 400 °C and 500 °C. These features of claim 1 patentably distinguish over the prior art and produce a novel result.

In the Office Action, the Examiner also took the position that "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." (See page 4 of the Office Action).

While the general rule is that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation, *Ex parte Peterson*, 228 U.S.P.Q. 216, 217 (B.P.A.I. 1985), the fact that the invention may have been the result of experimentation does not negate patentability nor render

obvious claimed parameters that were the result of experimentation. *In re Chu*, 66 F.3d 292, 36 U.S.P.Q.2D 1089 (Fed. Cir. 1995).

In the present claimed invention as set forth in claim 1, the general conditions of the claim, as described above, are not disclosed in the prior art. The citations of record are silent as to the combination of the temperature range between 400 °C and 500 °C and the rich condition control. The prior art is also silent as to the reduction-type NOx catalyst. Therefore, one of ordinary skill in the art would not have been able to discover the optimum or workable range by routine experimentation. Thus, the general rule, cited by the Examiner does not apply to the present claimed invention.

Furthermore, the mere need for experimentation to determine parameters needed to make a device work is an application of the often rejected "obvious-to-try" standard, and falls short of statutory "obviousness" under 35 U.S.C. 103. Therefore, the mere inability of an expert to predict the results obtainable with a claimed product suggests non-obviousness, not routine experimentation. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, U.S. P.Q.2d 1434 (Fed. Cir. 1988). Under the rule set forth in *Uniroyal*, even if it is found that some of the general conditions of the claim are disclosed in the prior art, the mere need to experiment to perfect the prior art would overcome the rejection under 35 U.S.C. 103.

Referring to the language of claim 1, and for the reasons described above in detail, it is submitted that neither Mukaihira et al. nor "design choice" teach or suggest:

a direct reduction type NOx catalyst provided in an exhaust passage and directly decomposing NOx during a lean condition operation and being regenerated during a rich condition operation, comprising prohibiting a rich condition control when the temperature detected by a catalyst temperature detector is greater than a set temperature which is within a predetermined temperature range of between 400°C and 500°C.

Therefore, it is submitted that claim 1 patentably distinguishes over the prior art.

2. Claim 2

Claim 2 is directed to an NOx purifying system direct reduction type NOx catalyst provided in an exhaust passage. Neither Mukaihira et al. nor "design choice" teach or suggest:

A NOx purifying system direct reduction type NOx catalyst provided in an exhaust passage and directly decomposing NOx during a lean condition operation and being regenerated during a rich condition operation, which comprises a catalyst temperature detector, and a control device to prohibit a rich condition control when the temperature detected by the catalyst temperature detector is greater than a set temperature which is within a

predetermined temperature range of between 400°C and 500°C.

Therefore, it is submitted that claim 2 patentably distinguishes over the prior art.

3. Claim 3

Claim 3 is directed to a method for regenerating a direct reduction type NOx catalyst which includes:

detecting the direct reduction type NOx catalyst temperature; and
regenerating the NOx while performing a rich condition operation only when the detected temperature is less than a set temperature which is between 400°C and 500°C.

Thus, the method of claim 3 recites its inventive features by specifying that a rich condition operation is performed only when the detected temperature is less than a set temperature which is between 400°C and 500°C. These features are not taught or suggested by Mukaihira et al.

Therefore, it is submitted that claim 3 patentably distinguishes over the prior art.

4. Claim 4

Claim 4 is directed to a NOx purifying system having a direct reduction type NOx catalyst which includes:

a catalyst temperature detector detecting a temperature of the direct reduction type NOx catalyst; and
a control device causing a rich condition control to be performed only when the temperature detected by the catalyst temperature detector is less than a set temperature which is between 400°C and 500°C.

Therefore, it is submitted that claim 4 patentably distinguishes over the prior art.

C. Claims 1-4 are Patentable Over Okada et al. in view of Design Choice

1. Claim 1

Okada et al. describes a process related to an occlusion-type NOx catalyst. In contrast, the present claimed invention as set forth in claim 1, relates to a direct reduction-type NOx catalyst which has different characteristics than the Okada occlusion-type NOx catalyst. Further, the present invention does not relate to restoration from poisoning with sulfur but to a restoration of the capacity to directly reduce NOx. As pointed out in paragraphs [0011] – [0013] of the subject specification, the present invention was developed based on particular characteristics of direct reduction-type catalysts. Further, as explained in paragraph [0042] of the specification, the present invention provides a method and system which avoids increases in

the temperature range of the catalyst for the concentration of NO_x at the catalyst outlet during rich condition control. Therefore, the NO_x in the exhaust gas can be efficiently purified while the NO_x is prevented from being discharged into the atmosphere. In addition, fuel costs are reduced.

Okada et al. discloses that, with respect to an occlusion-type catalyst, when the temperature of the catalyst is raised above a set temperature (600°C to 800°C), S purge control (regeneration control against poisoning with sulphur) is carried out.

In contrast, the present claimed invention relates to “a direct reduction-type catalyst” which has different characteristics from an “occlusion-type catalyst” (see the subject specification, paragraphs [0011] – [0013]). Also, the present claimed invention is directed to prohibiting rich condition control when the temperature rises above a predetermined temperature, a feature clearly missing from the disclosure of Okada et al.

In Okada et al., the described temperature of 250°C to 350°C is an activation temperature of the occlusion-type NO_x catalyst, while the temperatures 650°C, 600°C to 800°C, and 650°C to 800°C are for carrying out S purge (column 6, lines 47-57 and column 11, lines 27-32). The disclosure in Okada et al. and particularly the above-described temperatures do not teach or suggest a temperature range of 400°C to 500°C for prohibiting rich condition control as set forth in claim 1.

It is submitted that there is no teaching or suggestion in Okada et al. which relates to a direct reduction-type catalyst or the feature wherein a rich condition operation is prohibited above the prescribed temperature.

As described at column 12, lines 8-13 of Okada et al.,:

... the exhaust gas purifying apparatus of the internal combustion engine according to the present invention enables the stable regeneration of the catalyst device and prevents the deterioration of the exhaust gas characteristics caused by the deterioration of the catalyst device.

This has nothing to do with features of claim 1 as described at paragraph [0019] of the subject application which states:

And, by the NO_x catalyst regeneration method of this NO_x purifying system and the NO_x purifying system, the rich condition control can be performed avoiding the temperature range of the catalyst in which the NO_x concentration is increased at the catalyst outlet during the rich condition control. Therefore, it is possible to efficiently purify the NO_x in the exhaust gas while preventing the NO_x from being discharged into the atmospheric air. Moreover, since the direct reduction-type NO_x catalyst can surely be regenerated under the rich condition control, the fuel cost can be

prevented from worsening.

On pages 3 and 4 of the Office Action, the Examiner takes the position that:

Regarding the specific range of the catalyst air ratio and the catalyst temperature, it is the examiner's position that a range between 400°C and 500°C of the catalyst temperature, would have been an obvious matter of design choice well within the level of ordinary skill in the art, depending on variables such as mass flow rate of the exhaust gas, as well as the size of the engine, properties of materials for making the NOx storage catalyst, and the controlled temperature of the catalytic converter.

As discussed above with respect to Mukaihira et al., it is submitted that the Examiner's statement ignores the fact that Okada et al. is directed to an occlusion-type catalyst as opposed to the direct reduction-type catalyst of claim 1. Also, Okada et al. does not teach or suggest any features relating to prohibiting rich condition control when the temperature rises above a predetermined temperature. Therefore, it is submitted that the Examiner's position regarding "design choice" is deficient.

The function of the claimed structure of claim 1 is to purify the NOx in the exhaust gas while preventing the NOx from being discharged into the atmosphere. Okada et al. is silent as to the function and structure recited in the claimed invention.

Okada et al., as discussed above, would not have led one of ordinary skill in the art to modify Okada et al., to include the temperature range of 400 °C to 500 °C to prohibit a rich condition control to achieve purification of NOx. Furthermore, one of ordinary skill in the art would not have been led to modify the occlusion-type NOx catalyst system of Okada et al. to a direct reduction-type NOx catalyst system. Therefore, modification was not within the capabilities of one skilled in the art. *In re Aller*, 42 C.C.P.A. 824, 220 F.2d 454, 456, 105 USPQ 233, 235 (C.C.P.A. 1955). Thus, the Examiner's position that the claimed temperature range is an obvious matter of design choice is precluded because the claimed structure of claim 1 and the function of the claimed structure which is performed are different from the cited art.

The Examiner contends that there is nothing in the record that suggests the claimed parameters present a novel or unexpected result. See *In re Kuhle*, 562 F.2d 553, 188 USPQ 7 (CCPA 1975).

Applicants disagree with the Examiner's position. The novel features recited in the present claimed invention as set forth in claim 1, include the control device to prohibit a rich condition control when the temperature detected by the catalyst temperature detector is greater than the set temperature that is within a predetermined temperature range of between 400 °C

and 500 °C. These novel features would produce the result of efficiently purifying the NO_x in the exhaust gas, while preventing the NO_x from being discharged into the atmosphere. (See Specification, Paragraph [0019]).

As discussed above, there is nothing in the prior art that discusses the above-identified features of claim 1. The prior art is silent as to the prohibition of a rich control condition control when the temperature detected is greater than the predetermined range between 400 °C and 500 °C. These features of claim 1 patentably distinguish over the prior art and produce a novel result.

In the Office Action, the Examiner also took the position that “where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” (See page 4 of the Office Action).

While the general rule is that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation, *Ex parte Peterson*, 228 U.S.P.Q. 216, 217 (B.P.A.I. 1985), the fact that the invention may have been the result of experimentation does not negate patentability nor render obvious claimed parameters that were the result of experimentation. *In re Chu*, 66 F.3d 292, 36 U.S.P.Q.2D 1089 (Fed. Cir. 1995).

In the present claimed invention as set forth in claim 1, the general conditions of the claim, as described above, are not disclosed in the prior art. The citations of record are silent as to the combination of the temperature range between 400 °C and 500 °C and the rich condition control. The prior art is also silent as to the reduction-type NO_x catalyst. Therefore, one of ordinary skill in the art would not have been able to discover the optimum or workable range by routine experimentation. Thus, the general rule, cited by the Examiner does not apply to the present claimed invention.

Furthermore, the mere need for experimentation to determine parameters needed to make a device work is an application of the often rejected “obvious-to-try” standard, and falls short of statutory “obviousness” under 35 U.S.C. 103. Therefore, the mere inability of an expert to predict the results obtainable with a claimed product suggests non-obviousness, not routine experimentation. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, U.S. P.Q.2d 1434 (Fed. Cir. 1988). Under the rule set forth in *Uniroyal*, even if it is found that some of the general conditions of the claim are disclosed in the prior art, the mere need to experiment to perfect the prior art would overcome the rejection under 35 U.S.C. 103.

Referring to the specific language of claim 1 and for the reasons described in detail above, it is submitted that Okada et al. and “design choice” do not teach or suggest:

“A method for regenerating a NOx catalyst in a NOx purifying system having a direct reduction type NOx catalyst provided in an exhaust passage and directly decomposing NOx during a lean condition operation and being regenerated during a rich condition operation, comprising prohibiting a rich condition control when the temperature detected by a catalyst temperature detector is greater than a set temperature which is within a predetermined temperature range of between 400°C and 500°C.”

Therefore, it is submitted that claim 1 patentably distinguishes over the prior art.

2. Claim 2

Referring to claim 2, it is submitted that Okada et al. and “design choice” do not teach or suggest the claimed NOx purifying system for a direct reduction type NOx catalyst:

“A NOx purifying system direct reduction type NOx catalyst provided in an exhaust passage and directly decomposing NOx during a lean condition operation and being regenerated during a rich condition operation, which comprises a catalyst temperature detector, and a control device to prohibit a rich condition control when the temperature detected by the catalyst temperature detector is greater than a set temperature which is within a predetermined temperature range of between 400°C and 500°C.”

Therefore, it is submitted that claim 2 patentably distinguishes over the prior art.

3. Claim 3

Claim 3 is directed to a method for regenerating a direct reduction type NOx catalyst which includes:

detecting the direct reduction type NOx catalyst temperature; and regenerating the NOx while performing a rich condition operation only when the detected temperature is less than a set temperature which is between 400°C and 500°C.

Therefore, it is submitted that claim 3 patentably distinguishes over the prior art.

4. Claim 4

Claim 4 is directed to a NO_x purifying system having a direct reduction type NO_x catalyst which includes:

a catalyst temperature detector detecting a temperature of the direct reduction type NO_x catalyst; and

a control device causing a rich condition control to be performed only when the temperature detected by the catalyst temperature detector is less than a set temperature which is between 400°C and 500°C.

Therefore, it is submitted that claim 4 patentably distinguishes over the prior art.

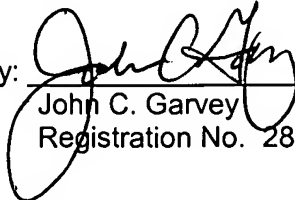
D. Conclusion and Summary

Applicants submit that claims 1-4 patentably distinguish over the prior art. Reversal of the Examiner's rejection is respectfully requested.

Respectfully submitted,

STAAS & HALSEY LLP

Date: 6-30-06

By: 
John C. Garvey
Registration No. 28,607

1201 New York Avenue, NW, Suite 700
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501

VIII. THE CLAIMS APPENDIX

1. (Previously Presented) A method for regenerating a NO_x catalyst in a NO_x purifying system having a direct reduction type NO_x catalyst provided in an exhaust passage and directly decomposing NO_x during a lean condition operation and being regenerated during a rich condition operation, comprising prohibiting a rich condition control when the temperature detected by a catalyst temperature detector is greater than a set temperature which is within a predetermined temperature range of between 400°C and 500°C.

2. (Previously Presented) A NO_x purifying system direct reduction type NO_x catalyst provided in an exhaust passage and directly decomposing NO_x during a lean condition operation and being regenerated during a rich condition operation, which comprises a catalyst temperature detector, and a control device to prohibit a rich condition control when the temperature detected by the catalyst temperature detector is greater than a set temperature which is within a predetermined temperature range of between 400°C and 500°C.

3. (Previously Presented) A method for regenerating a direct reduction type NO_x catalyst provided in an exhaust passage, comprising:
detecting the direct reduction type NO_x catalyst temperature; and
regenerating the NO_x while performing a rich condition operation only when the detected temperature is less than a set temperature which is between 400°C and 500°C.

4. (Previously Presented) A NO_x purifying system having a direct reduction type NO_x catalyst provided in an exhaust passage, comprising:
a catalyst temperature detector detecting a temperature of the direct reduction type NO_x catalyst; and
a control device causing a rich condition control to be performed only when the temperature detected by the catalyst temperature detector is less than a set temperature which is between 400°C and 500°C.

IX. EVIDENCE APPENDIX

Not applicable.

X. RELATED PROCEEDING APPENDIX

Not applicable.